

REMARKS/ARGUMENTS

Claims 7-16 are pending in this application. By this amendment, Applicant amends Claim 7.

Claims 7-11 and 13-16 were rejected under 35 U.S.C. § 102(b) as being anticipated by O'Connor et al. (U.S. 5,705,117). Claims 7-11 and 13-16 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Reiff et al. (US 5,173,220). Claim 12 was rejected under 35 U.S.C. § 103(a) as being unpatentable over either O'Connor et al., or Reiff et al., and further in view of Takeshi (JP 2001-237616). Applicant respectfully traverses the rejections of Claims 7-16.

Claim 7 has been amended to recite:

A method for manufacturing a three-dimensional photonic structure comprising a plurality of inorganic members composed of an inorganic material and a resin matrix within which the plurality of inorganic members are disposed, the resin matrix being composed of a photo-cured resin material, the method comprising the steps of:

preparing the plurality of inorganic members and a photocurable resin material;

successively and repeatedly performing a stereolithographic step for curing stacked layers composed of the photocurable resin material along a stacking direction to form a three-dimensional component such that cavities filled with the photocurable resin material are formed at locations to be occupied by the inorganic members in the three-dimensional component having a structure in which the plurality of cured resin layers composed of the photo-cured resin material are stacked;

inserting the inorganic members into concave portions when the concave portions are formed before closing the cavities during the stereolithographic step, each of the concave portions being at least a portion of the corresponding cavity and having an opening through which each of the inorganic members can pass, each gap between the surface of each of the concave portions and the corresponding inorganic member being filled with the photocurable resin material; and

thermally curing the photocurable resin material remaining in the cavities; wherein

heights of the inorganic members inserted into the concave

portions are substantially the same as a height of the cured resin material remaining in the cavities. (emphasis added)

The Examiner alleged that O'Connor et al. teaches all of the features recited in Applicant's Claim 7, and that Reiff et al. teaches all of the features recited in Applicant's Claim 7, except for the step of providing a plurality of inorganic members. The Examiner further alleged that it would have been obvious to provide a plurality of inorganic members in the process of Reiff et al. "principally in order to manufacture a desired three-dimensional structure." Applicant respectfully disagrees.

Each of O'Connor et al. and Reiff et al. is directed to a method of combining metal and ceramic inserts into a stereolithography component. However, neither the method taught by O'Connor et al. nor the method taught by Reiff et al. includes any step of "successively and repeatedly performing a stereolithographic step for curing stacked layers composed of the photocurable resin material along a stacking direction to form a three-dimensional component **such that cavities filled with the photocurable resin material are formed** at locations to be occupied by the inorganic members in the three-dimensional component having a structure in which the plurality of cured resin layers composed of the photo-cured resin material are stacked" (emphasis added) as recited in Applicant's Claim 7.

As disclosed in col. 3, line 64 to col. 5, line 20 of O'Connor et al. and in col. 3, line 20 to col. 4, line 40 of Reiff et al., both O'Connor and Reiff et al. teaches a method in which a laser is used to selectively cure a curable liquid material into a desired shape having a cavity into which an insert is disposed after the formation of the cavity. However, O'Connor et al. and Reiff et al. fail to teach or suggest (1) any step in which cavities are filled with a photocurable resin material prior to an inorganic member being disposed in each of the cavities, (2) that such a step of filling cavities with a photocurable resin material could or should be employed, or (3) any technical reason to employ a step of filling cavities with a photocurable resin prior to an inorganic member

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being disposed into each of the cavities or any advantages that are obtained thereby.

Thus, contrary to the Examiner's allegations, O'Connor et al. and Reiff et al. certainly fail to teach or suggest the feature of "successively and repeatedly performing a stereolithographic step for curing stacked layers composed of the photocurable resin material along a stacking direction to form a three-dimensional component **such that cavities filled with the photocurable resin material are formed** at locations to be occupied by the inorganic members in the three-dimensional component having a structure in which the plurality of cured resin layers composed of the photo-cured resin material are stacked" (emphasis added) as recited in Applicant's Claim 7.

On the Continuation Sheet of the Advisory Action dated May 4, 2009, the Examiner stated:

Applicant argues (pages 5 and 6) that O'Connor et al. and Reiff et al. do not teach the step of "successively and repeatedly performing a stereolithographic step ... such that cavities filled with photocurable resin material are formed". Examiner responds that O'Connor et al. and Reiff et al. teach such a step. For example, O'Connor et al. teaches that "[o]nce the stereolithographic process develops the lower section 38, the platform 16 is raised above the top level of the photopolymer 14 within the vat 12, and a metal lead structure 44 is manually inserted on top of the section 38 in an appropriately configured cavity 45 formed in the section 38, as shown, by the stereolithography press" (col. 4, lines 34-39 of O'Connor et al.). By the very nature of the stereolithography process, uncured resin remains in the formed cavity (45) when the platform (16) (which was submerged below the top level of the photopolymer (14)) is raised above the top level of the photopolymer (14).

Applicant respectfully disagrees.

Contrary to the Examiner's allegations, there is absolutely no teaching whatsoever in either of O'Connor et al. or Reiff et al. of a step of "successively and repeatedly performing a stereolithographic step for curing stacked layers composed of the photocurable resin material along a stacking direction to form a three-dimensional component **such that cavities filled with the photocurable resin material are**

formed at locations to be occupied by the inorganic members in the three-dimensional component having a structure in which the plurality of cured resin layers composed of the photo-cured resin material are stacked" (emphasis added) as recited in Applicant's Claim 7, and O'Connor clearly fails to teach or suggest that "the uncured resin remains in the formed cavity (45) when the platform (16) (which was submerged below the top level of the photopolymer (14)) is raised above the top level of the photopolymer (14)" as alleged by the Examiner.

O'Connor et al. merely teaches that the **platform 16** is raised above the top level of the photopolymer 14 within the vat 12, after the stereolithographic process has developed the lower section 38. Neither this portion nor any other portion of O'Connor teaches or suggests that **the upper surface of the lower section 38 in which the cavity 45 is formed** could or should be submerged in the photopolymer 14 after the lower section 38 has been developed, which would have been required in order for any uncured resin to remain in the cavity 45 of the lower section 38. Since the lower section 38 of O'Connor is disposed on the top surface of the platform 16, the mere fact that the platform 16 of O'Connor is to some undisclosed extent submerged in the photopolymer 14 when the lower section 28 is developed, certainly does not mean that the upper surface of the lower section 38 of O'Connor is or should be submerged after the lower section 38 of O'Connor has been developed. In fact, O'Connor et al. teaches that the platform is raised above the top level of the photopolymer 14 after the lower section 38 has already been developed, which suggests that the photopolymer resin which forms the lower section 38 (including the cavity 45) is completely cured when the platform 16 is raised above the top level of the photopolymer 14.

In order to further distinguish Applicant's Claim 7 over the prior art of record, Applicant's Claim 7 has been amended to recite the feature of "heights of the inorganic members inserted into the concave portions are substantially the same as a height of the cured resin material remaining in the cavities." Support for this feature is found, for

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example, in the second full paragraph on page 14 to the second full paragraph on page 15 of Applicant's originally filed Substitute Specification and in Figs. 4B and 4C of the originally filed drawings.

Neither O'Connor et al. nor Reiff et al. teaches or suggests anything at all about a height of a cavity, a height of an inorganic member disposed in a concave portion, or a relationship between the height of a cavity and the height of an inorganic member. Thus, O'Connor et al. and Reiff et al. clearly fail to teach or suggest the feature of "heights of the inorganic members inserted into the concave portions are substantially the same as a height of the cured resin material remaining in the cavities" as recited in Applicant's Claim 7.

Accordingly, Applicant respectfully requests reconsideration and withdrawal of Claim 7 under 35 U.S.C. § 102(b) as being anticipated by O'Connor et al., and the rejection of Claim 7 under 35 U.S.C. § 103(a) as being unpatentable over Reiff et al.

The Examiner relied upon Takeshi to allegedly cure deficiencies of O'Connor et al. and Reiff et al. However, Takeshi fails to teach or suggest the features of "successively and repeatedly performing a stereolithographic step for curing stacked layers composed of the photocurable resin material along a stacking direction to form a three-dimensional component such that cavities filled with the photocurable resin material are formed at locations to be occupied by the inorganic members in the three-dimensional component having a structure in which the plurality of cured resin layers composed of the photo-cured resin material are stacked" and "heights of the inorganic members inserted into the concave portions are substantially the same as a height of the cured resin material remaining in the cavities." (emphasis added) as recited in Applicant's Claim 7. Thus, Applicant respectfully submits that Takeshi fails to cure the deficiencies of O'Connor et al. and Reiff et al. described above.

Accordingly, Applicant respectfully submits that O'Connor et al., Reiff et al., and Takeshi, applied alone or in combination, fail to teach or suggest the unique

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combination and arrangement of features recited in Applicant's Claim 7.

In view of the foregoing amendments and remarks, Applicant respectfully submits that Claim 7 is allowable. Claims 8-16 depend upon Claim 7, and are therefore allowable for at least the reasons that Claim 7 is allowable.

In view of the foregoing amendments and remarks, Applicant respectfully submits that this application is in condition for allowance. Favorable consideration and prompt allowance are solicited.

To the extent necessary, Applicant petitions the Commissioner for a One-Month Extension of Time, extending to June 1, 2009 (May 30, 2009 falls on a Saturday), the period for response to the Office Action dated January 30, 2009.

The Commissioner is authorized to charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 50-1353.

Respectfully submitted,

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